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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,167	02/04/2002	Anthony D. Kurtz	Kulite-69	4919

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EXAMINER

NECKEL, ALEXA DOROSHENK

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,167

Applicant(s)

KURTZ, ANTHONY D.

Examiner

Alexa D. Neckel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how bonds formed "preferentially" (as currently amended) at intersections of channels is intended to limit the claims. Support cannot be found in the specification with which to assist one in determining the scope of this limitation. For examination purposes, the claim is treated as wherein bonds are included at, but not limited solely to, intersections of channels.

4. Claims 1-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The examiner does not find support for limiting dangling bonds only to the intersections of channels of the device.

Applicant presents that Paragraph [0007] supports this limitation in the claims. The examiner respectfully disagrees with applicant. While the recitation of choosing to located dangling bonds in "specific areas" may enable bonds at intersections of the channels, it does not provide support limiting the invention to bonds solely at intersections of the channels.

Since the written description does not use precisely the same terms used in the claim, the question is whether the specification directs or guides one skilled in the art to the subject matter claim. See, eg., Fujikawa v. Wattanasin, 93 F.3d 1559, 1570, 39 USPQ2d 1895, 1904 (Fed. Cir. 1996). The written description requirement has been analyzed such that the written description direct one to the claimed subject matter in the way that "blazemarks" on specific trees mark a trail through a forest. See In re Ruschig, 379 F.2d 990, 994-95, 154 USPQ 118, 122 (CCPA 1967). It found that a broad generic disclosure failed to constitute a description of a specific claimed compound. See Fujikawa, 93 F.3d at 1571, 39 USPQ2d at 1905 ("in the absence of [] blazemarks [that the claimed compounds were of special interest], simply describing a large genus of compounds is not sufficient to satisfy the written description requirement as to a particular species or subgenuses."). That direction must be expressed in "full, clear, concise, and exact" language. See Fields v. Conover, 443 F.2d 1386, 1391, 170 USPQ 276, 280 (CCPA 1971); In re Ahlbrecht, 435 F.2d 908, 911, 168 USPQ 293 (CCPA 1971); Ruschig, 379 F.2d at 996, 154 USPQ at 123.

In this instance, the general description of "specific areas" is not accompanied by any language which would direct one of ordinary skill in the art to the particular areas (where the channels intersect) recited in the claims.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-4, 6-11 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Little (4,392,362).

With respect to claims 1, 8, 9, 18 and 19, Little discloses an apparatus comprising:

a wafer of silicon (90);

a layer of borosilicate glass (95) (col. 8, lines 4-6) deposited on the silicon wafer (90);

a plurality of channels (94) between the silicon (90) and glass (95) with inlet and an outlet (col. 8, lines 13-16);

where the channels intersect (see figures 1-4); and

wherein the silicon (90) and glass (95) are bonded by a field assisted bond (col. 8, lines 6-8).

It is held that oxygen ions would inherently form in all areas of the glass when field assisted bonding is used, including at the intersections of the channels.

With respect to claims 2 and 3, Little discloses wherein the channels run in both

X and Y directions on the structure (see figures 1,2 and 4).

With respect to claims 4 and 7, Little discloses wherein there are additional wafers which are bonded to each other (col. 4, lines 25-26 and figures 5, 6, 10d and 11).

With respect to claim 6, Little discloses wherein the channels are rectangular in cross-section (see figures 5, 6, 8c, 8d, 9b, 9c, 10d and 11).

With respect to claim 10, Little discloses wherein there are vertical ports in the top layer in communication with the channels to enable fluid to be introduced to said channels (col. 4, lines 37-40).

With respect to claims 11 and 20, Little discloses all of the same structural elements made up of the same materials and therefor would inherently be capable of producing a high electric field when a voltage is applied to the structure.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 5, 12, 13, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Little (4,392,362) in view of Ashmead et al. (5,690,763).

With respect to claim 5, Little discloses wherein the channels are vee or rectangular shaped in cross-section and formed by etching, but does not disclose wherein the are circular in cross section.

Ashmead et al. discloses wherein etching can also be used to form curved/circular cross-sectional shaped channels/pathways (col. 14, lines 38-42). It

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would have been obvious to one of ordinary skill in the art at the time the invention was made to make the channels of Little with circular cross-sectional shape as it is merely the selection of another shape of channel formed by etching known to be effective in micro-reactors.

With respect to claim 12, Little fails to disclose wherein the channels are coated with a metal.

Ashmead teaches wherein silicon wafers in a micro-reactor can be coated with a metal, such as from groups II, IV and V, in order to increase resistance to corrosion and wear (col. 6, line 58- col. 7, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a metal coating to the wafer of Little in order to gain the advantage of increased resistance to corrosion and wear as taught by Ashmead.

With respect to claim 13, Little discloses wherein the channels are from 5-500 microns wide and thus fails to disclose wherein the channels have a diameter between 1 to 10 mils.

Ashmead et al. teaches wherein in micro-reactors (which can be made up of silicon and borosilicate glass wafers) can have channels from 10-5000 micrometers (.4-197 mils). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the size the channels of Little larger when increasing the overall size of the reactor and since those particular dimensions of channels are known to be effective in a micro-reactor.

With respect to claim 16, Little fails to disclose wherein the silicon wafer is coated

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with silicon dioxide.

Ashmead teaches wherein silicon wafers in a micro-reactor can be coated with silicon dioxide in order to increase resistance to corrosion and wear (col. 6, line 58- col. 7, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a silicon dioxide coating to the wafer of Little in order to gain the advantage of increased resistance to corrosion and wear as taught by Ashmead.

With respect to claim 17, Ashmead discloses wherein the coating can be from group III of the periodic table, which include Aluminum.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Little (4,392,362) in view of) in view of Ashmead et al. (5,690,763) as applied to claim 12, and further in view of Christl et al. (4,078,604).

With respect to claim 17, Little as modified by Ashmead teaches wherein silicon wafers in a micro-reactor can be coated with a metal, such as from groups III, IV and V, in order to increase resistance to corrosion and wear (col. 6, line 58- col. 7, line 3), but fails to teach wherein the metal can be gold.

Christl et al. teaches an apparatus wherein the cooling channels are coated with gold to ensure corrosion resistance of the cooling fluid (col. 1, lines 38-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Christl et al. to the modified apparatus of Little and apply a coating of gold to the channels in order to ensure corrosion resistance.

10. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable

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over Little (4,392,362), as applied to claim 1, and further in view of Robillard et al. (3,984,620).

With respect to both claims, Little discloses wherein the silicon wafers can be of those used in semiconductor electronics (col. 1, lines 12-29).

Robillard et al. teaches wherein silicon wafers for use in semiconductor are preferably intrinsic or doped silicon (col. 5, lines 4-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use intrinsic or doped silicon for the wafers of Little as it is merely the selection of semiconductor appropriate silicon wafers known to the art and as taught to be preferable by Robillard et al.

Response to Arguments

Claims 1-4, 6-11 and 18-19

Applicant argues that Little fails to teach reaction sites formed "preferentially" since the dangling bonds would be formed uniformly across the wafer.

The examiner respectfully disagrees with application.

First, as stated above, it is unclear how bonds formed "preferentially" (as currently amended) at intersections of channels is intended to limit the claims. Support cannot be found in the specification with which to assist one in determining the scope of this limitation. For examination purposes, the claim is treated as wherein bonds are included at, but not limited solely to, intersections of channels.

Second, it appears that applicant may be intending to recited that bonds may be preferred at just the intersections of the channels. It is noted that the claims contain the

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traditional transitional phrase of "comprising". The transitional term "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See MPEP 2111.03. As such, additional locations for bonds are not excluded from the claims.

Claim 20

Applicant argues that Little fails to disclose "one edge protruding into at least one of said channels".

The examiner respectfully disagrees. Little discloses two ways in which an "edge" would protruding into at least one of the channels. The first is that the channel could be made up of a porous structure (col. 3, lines 1-6) and the other is an embodiment where the channels are in a "serpentine" formation (col. 4, lines 33-37). The rejection is maintained.

Claims 5, 12, 13, 16 and 17

In response to applicant's argument that Ashmead is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Ashmead also teaches a micro-processor with channels formed by etching and which have increased resistance to corrosion and wear.

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Claim 17

In response to applicant's argument that Christl is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Christl also discloses cooling channels.

Claims 14 and 15

No further arguments are presented with regard to Robillard.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa D. Neckel whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alexa D. Neckel
Primary Examiner
Art Unit 1764

January 5, 2006


ALEXA DOROSHENK NECKEL
PRIMARY EXAMINER